Delaware Economic Development Office dedo.delaware.gov Innovation@work.

Ionization radiation imageable photopolymer compositions

Description of Technology: This invention discloses compositions that can be polymerized/crosslinked imagewise upon exposure to ionization radiation such as x-ray, electron beam, ion beam, and gamma-ray. This invention also discloses methods of use for these compositions for microfabrication of ceramics, for stereolithography, and for x-ray, e-beam, and ion-beam lithography which can be used for photoresists.

Patent Listing:

1. **US Patent No.** 6,569,602**,** Issued on May 27, 2003, "Ionization radiation imageable photopolymer compositions"
http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,569,602.PN.&OS=PN/6,569,602&RS=PN/6,569,602

Market Potential: UV-VIS-IR-sensitive photopolymer compositions have been used extensively in many applications in the area of photolithography, graphic art, stereolithography, and printing and publishing. All of these applications require materials that can be polymerized imagewise; that is, the polymerization reaction is spatially confined to the region irradiated by the photons to retain the input image with good fidelity and spatial resolution. Because of the short penetration depth (in absorbing media) and scattering problems of optical photons, the use of relatively thin and transparent photopolymer films is usually required for these applications. Opaque medium is very problematic for this technology. For example, conventional photopolymer technology is not suitable for the patterning of ceramic materials.

U.S. Pat. No. 5,556,716 (Herron and Wang) discloses x-ray sensitive photo-conductive compositions for digital radiography applications. The compositions comprise of hybrids of organic polymers and inorganic nanoparticles. Unlike the materials disclosed in the present invention, x-ray generated electrons and holes in these photoconductors do not induce any chemical reactions; they are separated and transported out of the,film under high fields.

Benefits:

- Induce chemical reactions
- Compositions can be polymerized/crosslinked imagewise

Applications:

- Microfabrication of ceramics, for stereolithography, and for x-ray, e-beam, and ion-beam lithography

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